



Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) Atmospheric-pressure ionization- ionization source device, adapted for atmospheric-pressure ionizing analytes in liquid phase, to be further analyzed by mass spectrometry, comprising

(a) an inlet assembly (11) ~~for introducing, vaporizing and heating the analyte solution into the ionization source in~~ fluid communication with an atmospheric-pressure ionization chamber (3);

(b) ~~an ionization chamber (3) in fluid communication with said inlet assembly (11),~~ the said atmospheric-pressure ionization chamber (3) being provided with an outlet orifice for communicating between the ionization chamber (3) and the analyzer or filter of the mass spectrometer, characterized in that

the said atmospheric-pressure ionization chamber (3) comprises a plate (4) having at least one active surface (4') which faces the internal aperture of the inlet assembly (11), the said active surface (4') being ~~electrically charged or~~ charge polarized.

2. (Currently Amended) The atmospheric-pressure ionization source device of claim 1, wherein the said active

surface (4') is ~~charged~~ charge polarized by connection with power supply means.

3. (Currently Amended) The atmospheric-pressure ionization source device of claim 1, wherein the said active surface (4') is charge polarized by induction.

4. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said plate (4) and the said at least one active surface (4') are made of an electrically conductive material.

5. (Currently Amended) The atmospheric-pressure ionization source device according to claim 4, wherein the said electrically conductive material is chosen between iron, steel, gold, copper or platinum.

6. (Currently Amended) The atmospheric-pressure ionization source device according to claim 4, wherein the said plate (4) is coated with a non-conductive material to form the said at least one active surface (4').

7. (Currently Amended) The atmospheric-pressure ionization source device according to claim 6, wherein the said non-conductive material is chosen between a silica or silicate derivative such as glass or quartz or a polymeric material such as PTFE.

8. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said at least one active surface (4') is provided with corrugations.

9. (Currently Amended) The atmospheric-pressure ionization source device according to claim 8, wherein said corrugations are point-shaped corrugations.

10. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said plate (4) is inclined of an angle which allows the ionized analyte to be reflected towards the analyzer of the mass spectrometer.

11. (Currently Amended) The atmospheric-pressure ionization source device according to claim 10, wherein the said angle is 45° when the angle between the axes of both the inlet assembly (11) and the outlet orifice is 90°.

12. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the plate (4) is 0.05 to 1 mm thick, preferably 0.1 to 0.5 mm thick.

13. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said plate (4) is linked, through connecting means (5), to a handling means (6) that allows the movement of the said plate (4) in all directions.

14. (Currently Amended) The atmospheric-pressure ionization source device according to claim 13, wherein the said connecting means (5) are made of an electrically conductive material.

15. (Currently Amended) The atmospheric-pressure ionization source device according to claim 13, wherein the said connecting means (5) are step-like shaped.

16. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said plate (4) is connected to power supply means (20).

17. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said inlet assembly (11) comprises an inlet hole (10) for feeding the analyte solution and an internal duct in fluid communication with the said inlet hole (10), said internal duct comprising a nebulization region (12) and a heating region (13) and ending into the said atmospheric-pressure ionization chamber (3).

18. (Currently Amended) The atmospheric-pressure ionization source device according to claim 17, wherein the said nebulization region (12) is in fluid communication with at least one gas lines (14, 15) for nebulizing the analyte solution and carrying it towards the atmospheric-pressure ionization chamber (3).

19. (Currently Amended) The atmospheric-pressure ionization source device according to claim 18, wherein the said gas is nitrogen.

20. (Currently Amended) The atmospheric-pressure ionization source device according to claim 1, wherein the said heating region comprises heating means, preferably a heating element connected to a power supply connector (16).

21. (Currently Amended) A mass spectrometer characterized in that it comprises a atmospheric-pressure ionization source device as defined in claim 1.

22. (Currently Amended) The mass spectrometer according to claim 21, further comprising:

- (1) a device, ~~preferably~~ optionally a Liquid Chromatograph, for the separation or de-salting of the molecules contained in a sample;
- (2) at least one analyzer or filter which separates the ions according to their mass-to-charge ratio;
- (4) a detector that counts the number of the ions;
- (5) a data processing system that calculates and plots a mass spectrum of the analyte.

23. (Currently Amended) A method for atmospheric-pressure ionizing an analyte to be analyzed by ~~means of mass spectrometry~~, the method comprising ~~the following steps~~:

- (a) dissolving the analyte in a suitable solvent;
- (b) injecting the said analyte solution into a atmospheric-pressure ionization source device as described in ~~any one of claims from 1 to 20~~ claim 1;
- (c) causing the analyte solution to be vaporized and heated;
- (d) causing the vaporized and heated analyte solution to impact onto an active surface (4');
- (e) causing the ionized analyte to be collected by the analyzer or filter of a mass spectrometer.

24. (Previously Presented) The method according to claim 23, wherein the analyte is dissolved in a dipolar solvent.

25. (Currently Amended) The method according to claim 24, wherein the solvent is selected from H₂O, an alcohol ~~such as~~ optionally methanol or ethanol, or acetonitrile.

26. (Previously Presented) The method according to claim 23, wherein the impact angle of the vaporized and heated analyte solution onto the active surface (4') is 45° or less.

27. (Currently Amended) The method according to claim 23, wherein the analyte solution is heated at a temperature ~~chosen in the range of from 200°C and 450°C, preferably of~~ optionally from 250°C and 350°C.

28. (Previously Presented) The method according to claim 23, wherein a potential difference of between 0 and 1000 V, in absolute value, is applied to the said active surface (4').

29. (Currently Amended) The method according to claim 28, wherein the said potential difference, in absolute value, is of between 0 and 500 V, ~~preferably of~~ optionally between 0 and 200 V.

30. (Currently Amended) The method according to claim 23, wherein the said analyte solution contains further an aminoacid, ~~preferably~~ optionally selected from the group consisting of glycine, lysine, istidine, aspartic acid and glutammic acid.